WHAT IS CLAIMED IS:

1.   A method for optimizing in real-time operation of a machine assembly manipulated by a user, said machine assembly comprising plural replaceable devices, each device being operated by a control module, the input-output relationship of which control module is regulated by control parameters, said method comprising the steps of:

(a) operating the replaceable devices using control modules;

(b) optimizing in real-time the input-output relationship of at least one control module by coding into templates parameters fully or partially regulating the control module, said templates being subjected to heuristic processing, wherein at least one fitted set of parameters is selected by evaluating output of the machine assembly based on the user's ultimate choice or a preselected target; and

(c) operating the machine assembly using the optimized control module.

2.   The method according to Claim 1, wherein the control module comprises a main control module and an auxiliary control module, and step (b) is conducted on the auxiliary control module.

3.   The method according to Claim 2, wherein the main control module and the auxiliary control module are arranged in series.

4.   The method according to Claim 2, wherein the main control module and the auxiliary control module are arranged in a line.

5.   The method according to Claim 1, wherein the control module comprises a central control module and a local control module, and step (b) is conducted on the central control module.

6.   The method according to Claim 1, wherein the heuristic processing is evolutionary computation, and the templates are chromosomes.

7.   The method according to Claim 6, wherein the control module regulated by control parameters is provided with a fuzzy inference system comprising a matrix of fuzzy rules which are regulated by preselected parameters, and the optimization step is conducted by at least one of the following:

(i) revising the fuzzy rule matrix by extracting a section from the matrix and coding elements of the section into chromosomes;

-24-

(ii) modifying the configuration of the fuzzy rule matrix defined by membership functions by coding elements of the membership functions into chromosomes; or

(iii) changing a level of an input of the parameters and a level of an output of the fuzzy inference system by coding elements of the levels into chromosomes.

8.   The method according to Claim 7, further comprising monitoring the fuzzy rule matrix in use while operating the machine, and evaluating the section extracted in (ii) or the membership functions to be modified in (iii).

9.   The method according to Claim 1, wherein the machine assembly is a watercraft.

10.   The method according to Claim 9, wherein the replaceable devices include a trim apparatus and an electronic throttle.

11.   An optimization apparatus for optimizing an operation characteristic of a unitary apparatus that can be used as a combined apparatus by combining other apparatuses, the optimization apparatus comprising:

an optimization process device for, in real time, optimizing the operation characteristic of the unitary apparatus, with a functional characteristic of the combined apparatus as an evaluation criterion.

12.   The optimization apparatus of Claim 11, further comprising a basic control module for deciding a manipulated variable of the unitary apparatus based on predetermined input information, whereby the optimization process device optimizes control parameters of the basic control module with a control characteristic of the combined apparatus as an evaluation criterion.

13.   The optimization apparatus of Claim 12, further comprising a compensation control module for deciding compensation quantity or compensation ratio of the manipulated variable based on predetermined input information, whereby the optimization process device optimizes control parameters of the compensation control module with the control characteristic of the combined apparatus as an evaluation criterion.

14.   The optimization apparatus of Claim 11, wherein the optimization process device includes an optimization operation unit for performing operation with respect to a optimization technique, and an autonomous evaluation unit for

evaluating with respect to optimization process based on a predetermined evaluation criterion, whereby the optimization process device controls using control parameters obtained by the optimization operation unit, and evaluating the result at the evaluation unit, carries out optimization.

15.   The optimization apparatus of Claim 11, wherein the optimization process device includes an optimization operation unit for performing operation with respect to a optimization technique, an evaluation input unit for inputting an evaluation based on a user's intention with respect to optimization process, whereby the optimization process device controls using control parameters obtained by the optimization operation unit, and evaluating the result at the evaluation unit based on evaluation information input by the evaluation input unit, carries out optimization.

16.   The optimization apparatus of Claim 14, wherein the optimization operation unit carries out operation with regard to optimization using heuristics.

17.   The optimization apparatus of Claim 16, wherein the heuristics is an evolutionary calculation method.

18.   The optimization apparatus of Claim 11, wherein the unitary apparatus is a power generator for a combined apparatus, and the other apparatuses are a body of the combined apparatus.

19.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an outboard motor and the other apparatuses are a hull.

20.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an electrically-driven auxiliary power device and the other apparatuses are a bicycle or wheelchair.

21.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an electronically-controlled fuel injection device of a motor and the other apparatuses are an electronic throttle device of the motor.

22.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an electronic throttle device of a motor and the other apparatuses are an electronically-controlled fuel injection device of the motor.

23.   The optimization apparatus of Claim 11, wherein the unitary apparatus is a body of a robot and the other apparatuses are a head, arms and /or legs of the robot.

24.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an indoor machine of an air conditioner and the other apparatuses are an outdoor machine of the air conditioner.

25.   The optimization apparatus of Claim 11, wherein the unitary apparatus is an outdoor machine of an air conditioner and the other apparatuses are an indoor machine of the air conditioner.